Montana Aeronautics Commission

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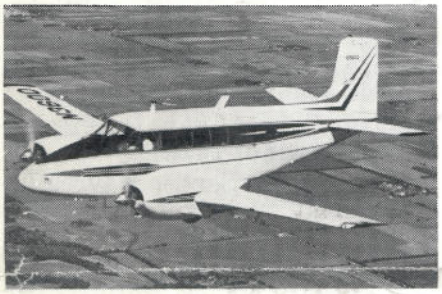

N186M COMES HOME

The Montana Aeronautics Commission took delivery this month on a Beechcraft all metal, seven place, twin engine model 65 Queen Air aircraft. The aircraft was delivered through Montana Aircraft Co., Billings, Montana, with special modifications and electronics gear installed by Combs Aircraft, Stapleton Airfield, Denver, Colorado. The Commission has retained, on a temporary basis, Mr. R. H. Bjerknes, veteran pilot from the Billings area for final shakedown flights and preliminary travel requirements of the Commission. In addition to the travel requirements of the Aeronautics Commission and the requirements of the Commission staff relative to aviation development work, the aircraft will further be used for executive travel in connection with the Governors office. It will further be available for other necessary travel requirements by other State departments as called for by the Governor or Montana Aeronautics Commission.

POWDER PUFF DERBY

A future event of much interest to aviation-minded Montanans is the Montana Women's Air Race to be held in the fall, Sept. 29-30, with rain dates of October 6-7. The race course will be along a route to include Lewistown, Bozeman, Helena and Billings. Start and finish points, as well as the order of the stops, have not yet been announced.

Any woman pilot residing in Montana with a private license or better will be eligible to enter.

A race committee composed of members of Montana Ninety-Nines is currently working out details of the course and rules. Rules will be based on those used in the All-Women Transcontinental Air Race, or Powder Puff Derby, in which scoring is accomplished by comparing ground speed with handicap "par" speeds for each make and model aircraft. The winner will be the aircraft whose ground speed is highest in relation to its handicap speed.

Information regarding rules, entries, course, and aircraft will be published and ready to release some time in June. The Montana Aeronautics Commission is working closely with the race committee in planning and coordinating the race. Race Committee members are Mary Jo Janey, Elsie Childs, Helen Dunlop, all of Helena; Elsie Hartley, Missoula; Laulette Hansen, Fort Benton; Vivienne Schrank, Jordan; and Marge Rolle, Billings.

"I KNIGHT THEE SIR GENE"

E. A. "Gene" Dunlop, professional instructor, School of Aeronautics, Helena Public Schools, Helena, Montana, received his award of merit, the Montana Flight Instructor Wings from Peggy Mitchell, Office Manager for the Montana Aeronautics Commission as Chuck Lynch, Director, watches from the background. In speaking of the Seminar following its completion, Gene said "I think all subjects were very informative as they were presented. I would not eliminate a single factor. The course of instruction was very well organized and presented through the entire ten days."

Official Monthly Publication of the
MONTANA AERONAUTICS COMMISSION
Box 1698
Helena, Montana
Tim Babcock, Governor
Charles A. Lynch, Director
Clarence R. Anthony, Chairman
E. B. Cogswell, Vice Chmn.
Herb Jungemann, Secretary
Walter Hope, Member
Carl (Bill) Bell, Member
Gordon R. Hickman, Member
Al Newby, Member
R. J. (Dick) Munroe, Editor

AIRPORT PROJECT NOTES BY JIM MONGER AIRPORT ENGINEER

Montana airport projects under development:

Harlowton—Preliminary engineering is underway to develop plans for a reconstruction program for the Harlowton airport.

Circle—A runway reconstruction program is being developed for the McCone County Airport located at Circle.

Hamilton—Preliminary engineering is being considered by the Ravalli County Airport Board for the construction of an all weather runway to serve this airport.

Anaconda—Meetings have been held by the Anaconda City Airport Commission with this office and with the FAA to determine the possibility of establishing a new airport to serve this city.

Dillon—The Beaverhead County Airport Board is now developing plans for the construction of an administration building for this airport. This airport now has 18 based aircraft.

Chinook—This office attended a meeting with the Blaine County Airport Commission at which time plans were discussed for the proposed runway extension at the Chinook Airport. The runway will be extended 1,300 feet and paved, and then lighted. This County Airport Board is very unique in that it maintains 4 airports, 2 of which are paved on a county mill levy of .22 per year. All of their development comes from this small apportionment by the county. The airports in Blaine County are Chinook, Harlem, Hogeland and Turner. It is believed that only one other county in Montana can meet this record and that is Chouteau County, Fort Benton being the county seat. Other airports in Chouteau County are Big Sandy, Carter and Geraldine.

Glasgow—Plans and specifications have been completed for the reconstruction of the NW/SE runway. This is a local, Montana Aeronautics Commission, Federal Aviation Agency project.

The Three Forks Airport now has a base operator; William Fairhurst, doing business as Fairhurst Flying Service. He offers flight instruction, ground school and 80/87 octane fuel. Fairhurst has built a small hangar on the airport and renovated the operations building.

Rolan Albright of Lewistown, Idaho has assumed operations of Roundup Flying Service, effective March 1. Mr. Albright will be doing business as Albright Flying Service and will provide fuel, repairs and crop spraying facilities. A unicom radio will also be in operation.

Gerry Eldred, former flight operator in Roundup, has moved to Billings and is Sales Manager for Empire Helicopter, which is the Brantly Helicopter distributor, with their office at Logan Field.

Cut Bank now has Unicom facilities at Oien Aviation.

CESSNA TOPS LIGHT AIRPLANE SHIPPERS IN 1961

Cessna Aircraft Co. was the top business, utility and pleasure airplane shipper in the U.S. during 1961, AIA reports. Cessna shipped $42,266,000 during the year. Beech Aircraft Corp. was second with $37,072,000 followed by Piper's $28,889,000. Other companies and their shipments were: CallAir $163,000; Champion $690,000; Lake $209,000; Mooney $3,987,000 and Aero Commander $11,047,000.

CONGRATULATIONS ! !
CERTIFICATES ISSUED RECENTLY TO MONTANA PILOTS

Jack L. Walrath, Miles City, Multi-engine on private
Ray Skovgaard, Lewistown, Ltd. Flight Instructor
Charles Preston Trask, Ballantine, Student
Agnes Marie DeGroat, Billings, Student
Wilmer E. Schuh, Billings, Student
Charles Procia Vaughn, Fairview, Student
Thomas Eugene Walling, Winifred, Student
Roger Duane Lippert, Great Falls, Multi-engine on commercial
William Emery Gray, Billings, Reissuance of Private
Gordon Clack Sands, Havre, Instrument on Flight Instructor
Charles Henry DeGroat, Billings, Private
Leo Barnard Baker, Billings, Reissuance of Commercial
Chester Douglas Dolan, Billings, Multi-engine on ATR
Johannes Evald Larsen, Plentywood, Student
John Masao Kotaki, Glasgow, Private
Steve Rodney Oglesby, Peerless, Ltd. Flight Instructor
Edward Yedlicka, Fromberg, Student
Martin Rudolph Stulc, Winifred, Student
Robert Bernard Leinweber, Billings, Student
Norman Andy Nerlin, Joliet, Student
Troy Athal Martin, Winifred, Student
Larry Clark Udlehoven, Winifred, Student
Donald P. Proue, Red Lodge, Student
James Daniel Kelly, Hardin, Private
Gary George Woltermann, Columbus, Commercial
Robert E. Flick, Dutton, Student
Theresa S. Kvande, Havre, Student
Jack L. Lincoln, Rudyard, Student

Donald Bradley Lock, Bozeman, Student
Robert Gillespie Spooner, Calgary, Student
Robert L. Hickman, Choteau, P ASEL
Leroy M. Schweitzer, Bozeman, C ASEL
Gary J. Cormier, Bozeman, P ASEL
Ralph E. Hanser, Broadview, Student
Jeffrey B. Morrison, Helena, CFI Airplanes & Instrument
William S. Harper, Helena, Private ASEL
Floyd Lee Biehl, Buffalo, Commercial ASEL
Darrell D. Tvaruzek, Havre, Student
Earl L. Repplinger, Great Falls, Student
Ferdinand E. Hardebeck, Butte, Private ASEL
John E. Rainbolt, Cut Bank, Student
Sybil Barber Ibey, Dillon, Student
Paul T. Christian, Missoula, Student
Gordon R. Johnson, Florence, Student
Curtis Raymond Bartz Ryegate, Student
Mary C. Luther, Cut Bank, Student
David L. Crowder, Missoula, Parachute Rigger
Graydon D. Johnson, Great Falls, Student
Richard D. Cook, Great Falls, Student
John A. Cassidy, Great Falls, Student
John Johnson, Plentywood, (Bozeman), Student
Wesley R. Anderson, Malta, Student
Raymond A. Steiner, Calif. Bozeman) P ASEL
Robert C. Peck, Bozeman, P ASEL
Thomas R. Uphill, Missoula, Parachute Rigger
David Ross Parry, Missoula, Parachute Rigger
Clarence D. Getz, Missoula, Parachute Rigger
Curtis Bierwagen, Missoula, Student
Habert E. Underwood, Missoula, Commercial
Rodney D. Snider, Missoula, Flight Instructor
David A. LeMieux, Boulder, Student
Garland W. Willman, Chinook, Student
Maynord J. LaFond, Malta, Student
Dale Gene Young, Great Falls, Student
Joseph E. Daylor, Great Falls, Student
Gary Edwin Spannuth, Hamilton, Student
Jerome L. Schiff, Polson, Student
Robert B. Barker, Polson, Student
James D. Jones, Cut Bank, Private ASEL
Ray B. Abercrombie, Cut Bank, Student
Willard B. Robinson, Bozeman, Student
Russel R. Cameron, Fort Benton, Private ASEL
Raymond T. Tow, Havre, Private ASEL

SAMUEL A. LEWIS, FLIGHT STANDARD TRAINING DIVISION

After a year and a half of duty with the Federal Agency Academy, Oklahoma City, on the indoctrination and standardization of newly employed general aviation operations inspectors and introducing new techniques, equipment and standardization of older inspectors in aircraft from small single engine up through light twins including the DC3, on both contact and instrument flight, Sam Lewis, had no difficulty in making his points with the instructor trainees at the Flight Instructor Refresher Seminar. It was early in his presentation of instrument instruction techniques that it became very recognizable that Sam's abilities as an old professional in the field of general aviation flight school training became apparent. Sam's instructing technique and psychology of teaching were readily apparent in the manner in which he presented a heavy dual schedule daily on instrument and multiple engine teaching techniques throughout the entire ten days of the Seminar. Each afternoon Sam could be found at the F89 simulator over at the Montana Air National Guard building on a follow up and coaching program to his trainees. His thoroughly refreshing sense of humor went over tremendously with all persons involved and was probably symbolized most adequately during a discussion on the hazards involved in low level instrument flight when he said "— and if you're at that altitude, you can merely file your flight plan with the Bureau of Mines."

MONROE QUITS AS NATA EXECUTIVE DIRECTOR

Robert E. Monroe has resigned as executive director of the National Aviation Trades Association in the wake of disputes regarding the General Aviation Council and other matters. Monroe, who had held the post four years, said his plans for the future have not yet jelled. He will leave NATA this month.

The disagreements between Monroe and the NATA executive committee came to a head during the group's annual convention in December. A major point of argument came over whether NATA should re-join GAC. Monroe opposed the move because he felt GAC procedures have undermined the voice of individual organizations and special interests in FAA matters and other governmental actions. He termed membership in GAC "an exercise in futility." NATA overrode Monroe's objections and voted to investigate the possibility of rejoining GAC.

Monroe disagreed with NATA's decision not to increase membership dues and with other programs voted by the association.

DIRECTORS COLUMN

WHY REGISTER?

For many years, discussions have arisen among pilot groups concerning the relative merits of pilot registration laws and regulations as laid down by the Montana Aeronautics Commission. Let us here take just a moment to consider first the jurisdiction and responsibilities given to the Montana Aeronautics Commission by the Legislature.

Since the Commission has the responsibility to foster and promote aviation, to regulate and to supervise, and in addition thereto, develop airports and aviation facilities, it is only natural that valuable statistics have been gleaned over a long period of time. Because of the fact that long range statistics are by far more accurate than spot surveys, it is entirely conceivable that the pilot population of the county or community coupled with the statistical information on owned and based aircraft lend considerable weight to the justification of airport development. We doubt that intelligent aviation development work could be done without reliable statistical information available to the aviation planners, both at City and State levels.

Most of the older pilots in the State are aware of the policy of the Commission to establish the search and rescue budget equal to a figure double the amount received from pilot registration annually. In many years it has been necessary to expend more than the total amount originally earmarked for this operation in carrying out extensive search and rescue operations when these critical occasions arise. Other years, of course, the total allotted budget has not been expended, but in no year since the formation of the Commisison has the expenditure for search and rescue operations equaled an amount less than that derived from pilot registration. It has been the policy of the Commission for a number of years to reimburse pilots and operators for their actual costs relative to fuel, oil and telephone communication expenses arising out of an actual aerial search operation. This, of course, has necessitated the control through the fifteen search and rescue area coordinators here in Montana. Unfortunately, it is not too difficult to visualize a search operation under adverse weather conditions in mountainous terrain actually expending the entire annual budget in one major operation. We are grateful, of course, that this occasion has never arisen.

Let me take this opportunity, then, to again briefly outline pilot registration regulations for the State of Montana: "It is required that all pilots operating aircraft in Montana register their FAA airman certificate annually on or before April 1 with the office of the Montana Aeronautics Commission. Registration will be on an approved form provided for this purpose. The registration fee is $1.00. A registration certificate will be issued as evidence of compliance. Pilot registration is required by student pilots, private, commercial and airline transport pilots who are not engaged in scheduled interstate airline operations.

It is further required that all pilots operating aircraft for the distribution of chemicals, seeds or bait be registered annually at the office of the Montana Aeronautics Commission. Registration will be made on an approved form provided for this purpose. All agricultural pilots will also be registered in compliance with paragraph one above."

All registered pilots will receive "Montana and the Sky", a monthly publication issued by the Montana Aeronautics Commission.

Pilots who are registering for the first time may also request a copy of the Montana Airport Directory.

May I, therefore, take this opportunity to urge you, if you have not previously registered for 1962, and as the April 1st deadline is now with us, please do so immediately.

Charles A. Lynch, Director

April 27, 1920—First warrant in U.S. for reckless aerial driving is issued in Los Angeles against Omer Locklear.

Operator's Corner

OPERATOR OF THE MONTH
CARL SCHIRMER OF
SKY SUPPLY, INC.
HELENA, MONTANA

Carl was born in Kalispell, Montana and received his first flight instruction in 1927 from Mamer Air Transport and Biglow Johnson Flying Service of Spokane, Washington.

In 1929, he bought his first aircraft and took to the skys barnstorming throughout the Pacific Northwest. He joined the Washington National Guard in 1931, and flew with the 116th Observation Squadron as a 1st Lieutenant.

Carl married a Spokane girl in 1944 and moved to Helena in April, 1947, when he was employed with the Montana Aeronautics Commission as Assistant Director to Frank W. Wiley. In January of 1948, he assumed his present position with Sky Supply, Inc., a division of Johnson Flying Service of Missoula, Montana, dealing in aircraft parts and supplies and agricultural chemicals.

ACCIDENT PREVENTION

By BERNARD A. GEIER

Prior to the Spray Season last year I sent out a letter concerning the operation of agricultural aircraft. In this letter I suggested that Ag operators load their tank with water and go to a safe altitude and determine the characteristics of their aircraft under normal spray conditions. Along with this, I suggested that installation of a ball bank instrument to check

on coordination. Speaking for the Billings District, the eastern half of Montana, we went through the last season without a reportable accident. Whether this was the result of using these suggestions is not known, but I believe they can certainly help to keep the accident rate low.

During the Montana Aeronautics Commission Flight Instructor Refresher Course at Great Falls, I had the opportunity to discuss these items with spray pilots who attended the course. A few told me that they had a ball instrument installed in their aircraft and that they felt that it made their application work easier and did not distract from their normal operation.

One major item was discussed that affects all pilots. During a turn to the left, it becomes apparent that left rudder and right aileron is required to maintain a coordinated turn. Many pilots have been told over and over to stay off of the rudders in a turn. When the forces involved in the turn are all considered, we find that a major force not thought of is the gyroscopic effect of the propeller. The propeller acts the same as the gyro wheel in a turn and bank instrument. When the plane of rotation is changed, a gyroscopic action is set up. In the case of the propeller, with normal right hand rotation, in a turn to the left, the reaction is to the right or the same as holding right rudder in the turn. Unless left rudder is applied, a slipping turn results. This, then, will result in a higher stalling speed, an increase in drag and if a climbing turn is attempted, a decrease in the rate of climb. All these items cause a decrease in the aircraft performance. Incidently, the right aileron is needed in any turn over a medium bank to the left to stop over-banking tendencies. In a turn to the right, the gyroscopic reaction is to the right or down with relation to the horizon. In this case, the elevator will correct for the reaction and bottom rudder is not needed. Top aileron will be required when more than a medium bank is used.

What is "P" Factor? Tune in next month.

CUT BANK HANGAR PLANS M.P.A. CONVENTION

The Cut Bank Hangar of the Montana Pilots Association is making preparations for their annual convention which is being held May 18, 19 and 20 in Cut Bank.

The highlight of the convention will be the appearance of a guest speaker at the banquet table on the evening of May 19th. Speaking to the convention will be Mr. Joseph H. Tippets, Federal Aviation Agency, Assistant Administrator, Western Region. Mr. Tippets will speak on "The FAA—Western Region—It's Mission, Functions and Programs." It is felt that Mr. Tippet's talk will be of interest to all pilots and aviation enthusiasts in Montana.

The theme of the Convention's Saturday night dance is a "Hard Times" party, which has been explained as being something like a shipwreck theme. If anyone would like to know what one would wear aboard ship, just before the wreck, contact Phyllis Sammons, Secretary for the Cut Bank Hangar.

Reservations for accommodations may be obtained ahead of time by writing to Mr. Art Stubkjaer, Glacier Hotel, Cut Bank, Montana Official registration will be made at the Cut Bank Airport and at the convention banquet May 19.

PILOTS FLY-IN BARBECUE

Arnold Fredriksen of Modern Air Flight Service in Culbertson, invites all pilots together with family and friends to fly in and enjoy the free Pilots Fly-in Barbecue to be held during the Culbertson Diamond Jubilee celebration, June 2. The airport will be in top shape with ample supplies of 80 and 100 octane fuel. Also complete shop facilities. There will be plenty of tie down space, but pilots are asked to bring their own tie downs.

Transportation will be available from the airport to downtown Culbertson, the site of the barbecue.

All pilots are urged to attend. It is certain there will be no dull moments.

BETTY MORGENSEN AIRPORT SECRETARY

Betty Morgensen, Airport Division Secretary and Pilot Registration Clerk, was born in Townsend, Montana. She attended schools there and Helena Business College for a year. Betty has lived in Helena since being graduated from Broadwater High School, except for three years spent in Havre where her husband Ed was transferred with the Mountain States Telephone Company.

This attractive red-head not only adds charm to the Commission office, but is an efficient asset to the Commission Airport Division. Betty has been with the Commission for two and one-half years.

The Morgensen's have two children, Sara and Steve, who attend St. Helena School.

WANTED: Crop spraying job for this season. 14 years spraying experience. Will also accept commercial flying job of any kind and holds an A&E. Contact: Glenn L. Scott, 1215 10th Avenue S. W., Great Falls, Phone 453-8343.

FOR SALE: 1947 Stinson Voyager, model 108-2. TT 1754. 763 hours SMOH. LF receiver, VHF transmitter. Fabric excellent, brown and cream color. Licensed through September 1962. $2,650.00. Contact Leonard Stuart, Havre, Montana. Phone 265-9068.

FOR SALE: Airport Beacon tower, light, Syncronous motor, timer. $500.-00. Pete Albinola, 911 W. Teddy Ave., Kellog, Idaho. F.O.B. Kellog, Idaho.

FOR SALE: WIND SOCKS. 24" standard $8.00 36" Commercial type $16.00. Send order and payment to Montana Aeronautics Commission, Box 1698, Helena, Montana.

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THEY LEARN FROM AN OLD PRO

From right to left, Bob Winterowd, Filght Line, Inc., Belgrade, Rod Snider, Johnson Flying Service, Missoula, and Jim Kruger, Cut Bank, listen attentively as Bernie Geier, FAA GADO, Billings, Montana fully explains an item in Flight Technique. Bernie, along with Bill Cantwell, GADO Helena, carried the load of actual demonstration of flight techniques each afternoon which had been covered by JOE FALLIN, FLIGHT STANDARD TRAINING DIVISION, FAA ACADEMY, in his forenoon ground school sessions in the classroom. The flight training demonstrations were conducted along the lines of pointing out both the best instruction techniques and the maneuverability and performance figures of each make and model of aircraft as outlined by its manufacturer in the operators manual. Further demonstrations were made relative to critical speed factors of the various light twins with regard to single engine performance. Emphasis was placed on demonstrating to these instructors what their graduate students would be required to do when presented to the FAA for flight testing. When it is considered that the selection of the first group of instructor trainees for the Flight Instructor Refresher Seminar were made on the basis, generally, of those men who had presented the greatest number of trainee graduates to the FAA during the last twelve months, it is anticipated that the knowledge and information gleaned from this Flight Instructor Refresher Seminar will therefore, have the greatest potential impact on the industry generally, within the near future.

ATTENTION AND ATTENDANCE

Without interruption, absence or tardiness, 20 instructor trainees took on 50 hours of ground instruction for a total of 1,000 man hours of class room instruction in both teaching and flying techniques without a single absence or interruption from class. The methods and capabilities of the teaching staff were portrayed in the thinking of the trainees when in the last stages of intensive ground school, the question was asked whether or not similar seminars in future years could be staged on a shorter work week. The almost unanimous decision of those in attendance indicated that such a well rounded out and intensive course could not be shortened and it was felt that future seminars should be planned on the basis of a ten day operation.

Student interest ran at an all time high during the presentation of the section on the psychology of learning by NEIL A. FOX, CHIEF, TRAINING DEVELOPMENT DIVISION, FAA ACADEMY, OKLAHOMA CITY, OKLAHOMA, who has previously supervised the staff of education specialists conducting instructor training and having formerly served on the staff of the assistant to the Director of the Aeronautical Center in Oklahoma City. Neil came to us with both a PHB and a PHM degree from the University of Wisconsin and presented a very comprehensive three part course covering the learning process preparation and design of instruction and the psychology of individual differences. The only criticism from the trainee instructors on his part of the course was the fact that it was not sufficiently long enough to satisfy all of their questions and desires relative to teaching techniques. The above photo was taken during one of the extremely interesting and intensive presentations made by ARTHUR L. JACOBSON, AVIATION FORECASTER, GREAT FALLS CENTER.

WINTER RUNWAY MARKERS

The Missoula County Airport has been marking runway edges this winter with a red liquid dye. This has proven very useful in fog conditions or when the ground is covered with snow. Many times under such a condition, it is difficult for the pilot to determine the outline of the runway.

Two or three tablespoons to a half cup of the liquid dye will color a 55 gal drum of water and outline all the runways on the Missoula airport. The airport manager uses one boom from a regular weed spray rig and sprays the edges of the runways in that manner. It's real potent, one drop and you discolor all the clothes you happen to have on you at the time. The USFS advises 55 gallons runs approximately $75.00 but feel certain you could obtain it in smaller quantities.

Dupont Dyes & Chemical Division
Organic Chemical Department
Wilmington, Del.

Markings on the barrel are as follows: Rhodamine "B" Solution.

Caution, contains free acid, may irritate skin and eyes.

COMING AVIATION EVENTS

March 30th—8th Annual Alberta Flying Farmer Convention and Region Seven meeting. Contact Alberta Flying Farmers, Box 95, Postal Station B, Calgary, Alberta.

May 18-19-20—Montana Pilots Association Convention, Cut Bank, Montana. For reservations, contact Mr. Art Stubkjaer, Glacier Hotel, Cut Bank, Montana.

The Montana Airport Managers Association will hold its annual one day meeting in Helena on May 2, 1962. The MAMA will be sending out more detailed information soon.

LOW LEVEL MECHANICAL TURBULENCE FOR CURRENT TRANSPORT AIRCRAFT

TURBULENCE	DEFINITION
Light	A turbulent condition during which occupants may be required to use seat belts, but objects in the airplane remain at rest.
Moderate	A turbulent condition in which occupants require seat belts and occasionally are thrown against the belt. Unsecured objects in the aircraft move about.
Severe	A turbulent condition in which the aircraft momentarily may be out of control. Occupants are thrown violently against the belt and back into the seat. Objects not secured in the aircraft are tossed about.
Extreme	A rarely encountered turbulent condition in which the aircraft is violently tossed about, and is practically impossible to control. May cause structual damage.

AIR SPEED FLUCTUATION	*Ue	*Ude
	the order of	
5 to 15 knots	5 fps	8 fps
15 to 25 knots	15 fps	24 fps
more than 25 knots	25 fps	40 fps
Rapid fluctuations in excess of 25 knots	30 fps and above	48 fps and above

(Established by the NACA Subcommittee on Meteorogical problems)
*Ue—Effective gust velocity
*Ude—Derived gust velocity

MONTANA WESTERLY FLOW AIR TURBULENCE

It is quite well-known among aviators and aviation meterologists that a flow of any strength passing over a mountain barrier will produce so-called mechanical air turbulence, particularly in the few thousand feet of airspace above the ground on the lee side of the mountains. In Montana this turbulence often extends to considerable height, sometimes as high as 14,000 or 15,000 feet above sea level, and at these levels sometimes shows up as apparently stationary lenticular clouds (standing waves) downwind from a mountain section. These clouds are not stationary except in appearance, however, because the wind blows through them at relatively high speeds, condensing and forming cloud in the rising part of the turbulent wave and evaporting and dissipating cloud in the downwind, downward part of the wave. At times two or more of these standing wave clouds will lie, one following another, in a line down wind.

Another and more troublesome facet of this mechanical turbulence is the small scale eddy currents that can form in our canyons and in the lee of some of our more complex mountain and ridge configurations during periods of strong winds near the surface. Most commonly this phenomenon is associated with westerly winds, and roughly it becomes more troublesome as the wind increases. We say most commonly because the larger share of our winds producing mechanical turbulence of this kind blow from the westerly quadrant. The fact that Montana pilots with considerable experience in this type of turbulence probably are familiar with areas where the phenomenon is more common or more pronounced than others led one such pilot, Ray Austin of Helena, to suggest that such experience, if pooled, might produce a usable map of low-level mechanical turbulence areas for the benefit of students or new pilots to the area.

At a meeting in Helena February 17, 1962, a group of 15 experienced Montana pilots met to discuss this problem, defined for the purposes of the discussion as mapping Montana areas where considerable low-level mechanical turbulence is encountered under conditions of moderate or stronger westerly flow. A surprising degree of agreement was found for most areas. It is by no means certain that westerly flow will always produce moderate or stronger turbulence in these areas, nor is it intended to convey the impression that turbulence cannot or will not be found elsewhere. What it does say is that this is an approximation of the experience of 15 Montana pilots; experience which outlines these areas as the ones where turbulence has been most often encountered, and where, when encountered, it is usually stronger than in nearby areas not outlined.

A map may prove helpful in pointing out to student or out-of-state pilots the areas along their routes where rough air most often occurs under westerly flow. While lee slopes of mountain areas everywhere are well-known as areas of wind-induced mechanical turbulence, it is also common knowledge that some areas are usually "rougher" than others. This map could define some of these rougher sections in terms of pilot experience.

It is important to note that this discussion does **not** cover other types of turbulence, which are at the same time less common. Thunderstorms, or even simple convection over varying types of ground surface, produce another type of rough air. And frontal zones, surface or aloft, cold or warm, or any zone of shear between wind currents, can produce other types. These will be discussed in future articles.

All of us at some time or another have undergone an experience which we thought would benefit others if we could have passed the information on to them. By the same token we all have had experiences which we thought could have been avoided if we had been forwarned. All our "hangar sessions" consist of this exchange of information.

The FAA has recently re-established a publication "General Aviation Inspection Aids" which is a catalog of all the "service difficulties" experienced by various mechanics, owners, pilots during their inspection or operation of an aircraft. These are listed and published, not with the intent to discredit a particular aircraft, but to inform the reader of a potential trouble area which may need inspection or attention. These listings name the aircraft by make and model, and hten briefly describe the problem. In many instances, inspection of a similar make and model aircraft will reveal a like condition which when corrected may precent later difficulties. These General Aviation Inspection Aids are assembled from the malfunctioning and de-

fects reports (Form FAA-1226 sent to the local FAA General Aviation District Office by the mechanics, pilots and owners in that area. The reports received are verified, then forwarded for coordination with the appropriate manufacturer. If the reports are numerous enough, or indicate a trend of a serious nature, they are published in the form of an Airworthiness Directive, another FAA publication which is available to the public free of charge.

Pilots, owners, mechanics and fixed base operators are encouraged to obtain a free self-addressed package of Form FAA-1226 from their local General Aviation District Office for reporting service difficulties when they occur. The results of the reporting procedure, General Aviation Inspection Aids, should be on the reading list of all aircraft owners, pilots, fixed base operators and mechanics to provide an additional guide during their aircraft inspections. This publication and 11 supplements are sold as a single subscription for $1.25 and may be ordered from the U. S. Government Printing Office, Washington 25, D.C. The FAA Airworthiness Directive cards are maintained by all active mechanics and Authorized Inspectors and may be reviewed by contacting the facility maintaining your aircraft or your local FAA General Aviation District Office.

BIGGER ROLE FOR AIR TAXIS

Members of the National Air Taxi Conference attended the National Aviation Trades Association's annual meeting in Washington last December heard Civil Aeronautics Board Chairman Alan S. Boyd praise air taxi operations as a basic element of our national air transportation system and predict even greater achievements ahead for this burgeoning phase of U.S. aviation.

In Boyd's opinion, air taxi service has barely scratched the surface. Considerable work must be done in making the service better known among the traveling public as well as among the sales agents selling scheduled airline tickets. Too often, people use car rental service to reach off-airline points.

For the year ending September 30, members of the National Air Taxi Conference carried 97,712 passengers with a perfect safety record. This represents a 20 per cent increase over the preceding 12 months. A total of 20,106 passengers were caried "to" the airlines and 16,272 "from" the airlines Revenue passenger miles hit a new high of 28,744,688.

Citing the taxi operators for their contributions to air transportation without benefit of subsidy, Chairman Body emphasized that the inherent flexibility of air taxi service will prove to be their greatest asset. He predicted that, since the airlines are now providing service at too many airports, a realignment must take place by developing a pattern of regional service through airports centrally located and with convenient access to the surrounding cities which they are to serve. Such a realignment will bring about a wider public use of air taxi service. "As business grows, Boyd pointed out, it will become possible to synchronize your services, to promote joint use of one trip, and the price to each passenger should approach that of scheduled service."

If, as the Chairman believes, we must begin to think in terms of service between metropolitan areas instead of between individual communities, there's little doubt but that a third level of air transportation is in for full development during the next decade. It is also crystal clear that the air taxi operators will be the main bloodstream of this new development in domestic air transportation. Their amazing record of service and safety speaks for itself. (From January, 1962 issue of Flight Magazine, page 14.)

FOR SALE: Aeronca 7AC-7BC conv. 85 Continental, Metal prop. 8.00-6 tires, Scott 3200 tail whl. Restricted. FOR SALE: A-75 Continental just majored. 180 hrs. on new jugs. Some new and used aircraft parts, Piper and Aeronca. Some new and used engine parts, Continental & Lycoming. Some Lycoming O-145 parts. A few A-65 & 75 continental engines overhauled for snow sleds. Contact Marion S. Sheely, Circle, Montana.

FOR SALE: 1946 Aeronca Champ 7AC Cont. 65, 550 since major, Fabric new in 1957, metal prop. $1000.00. Contact LeRoy Schweitzer, Route #1, Denton, Montana. Phone 567-2385.

FOR SALE: 1947 Piper J-3-65 with metal spar and good tires. All fabric except for wing tips, pull tests better than 65 lbs. Tips need recovering. Prop must be replaced. Total time on air frame 2030 hours, total time on engine 1550 hours, T.O.H. at 900 hours. Will take best offer. Contact K. Wilhelm, 202 Lindley Place, Bozeman, Montana.

FOR SALE: 1946 Taylorcraft BC 12 A. Rejuvenated, repainted and new glass installed around 1959. 60 hours SMOH. Tires and prop very good. One wing tank. Annual due November, 1962. $1050.00. Contact Cloe J. Barkley, Baker, Montana.

FOR SALE: Aeronca Sedan, metal wings, Sorenson sprayer, aluminum skis, all in A1 condition, $4000.00. Contact Ronald Jensen or D. B. Walker, Loma, Montana.

FOR SALE: Aeronca Sedan, Fresh annual, metal wings. Fuselage all worked over and just covered with Ceconite. New paint job, new control cables, new battery and compass. Two sets tires. VHF transmitter, low frequency receiver with direction finder. Stall warner. A real mountain airplane! 1,100 total time, 500 on majored 145 Continental. Would consider trading down to a two place—What have you? $3,600.00 firm. Contact Dr. J. L. Cromwell, Box 420, Livingston, Montana.

WANT TO TRADE a new Case tractor with 63 hours plus a new full-mount tandem disk, whole outfit worth $4200, for a good plane worth at least $3000. Contact Royal Turley, Three Forks, Montana. Phone 48W.

FOR SALE

1. D1700 Kohler motor-generator 32V D.C.

2. D1700 Kohler motor-generator 32V D.C.

3. Switch board with type MU30-TRK time clock 32V-30 Amp. D.C.

4. 6 ea. rolls wire, two wire, multiple strand #12 copper.

5. 6 ea. chests.

6. 2 ea. chests with approach lights (AAF B-2 portable field set) 20 ea. lights (runway AAF B-2) 25 ea. cones (runway AAF-2) 20 ea. bulbs for runway lights.

Bids to be submitted on any or all items. Mail bids to the County Clerk and Recorder, Carbon County Joint Airport Board, Red Lodge, Montana. Bids to be opened May 28, 1962. Equipment may be inspected at the City Shops, Red Lodge, Montana.

Aerial photographs of the Venezuelan jungles led to the discovery of iron ore deposits worth 4 billion.

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Aerial photographs of the Venezuelan jungles led to the discovery of iron ore deposits worth 4 billion.

FAA SCHEDULES MEETINGS COVERING NATION TO DISCUSS PROPOSED RULES

Proposed changes in regulations covering general aviation airmen and aircraft will be discussed at eight regional Air Share meetings scheduled by the Federal Aviation Agency between April 18 and 30.

The conference will be devoted to exploring tentative FAA proposals for revision of Civil Air Regulations concerning general aviation. Later, when proposed rules are written, formal comments from interested parties will be sought by the Agency. An Air Share meeting will be held in each of the FAA's seven regions and in Washington for the convenience of the entire general aviation community.

In more than 100 similar previous meetings, the FAA has received suggestions, criticisms and comments volunteered by individuals and groups. They have been carefully analyzed in preparing the agenda for the April meetings. Discussion will be confined to this agenda. However, if time permits, other matters may be discussed.

Proposed rule changes scheduled thus far for the agenda include requirements for additional instrument flight equipment—carburetor heater, pitot tube heater, an alternate source of power for gyroscopic instruments, an alternate source of static pressure, and vacuum gauge or means of power failure warning.

Other proposals:

Subclasses of certain types of aircraft would be specified on which transitional pilot checks would be required before carrying passengers. For example, aircraft without retractable landing gear, controllable propeller and wing flaps would be included in one subclass.

Three instead of five landings and takeoffs within the previous 90 days would be required as recent flight experience for pilots qualifying on a different subclass of plane. Recent experience requirements for night flight would be deleted, but pilots holding a commercial certificate without a notation of night flying experience would be required to take a checkout flight. "Grandfather" rights would be provided for presently certificated pilots.

Pilots would be required to have ratings for new types of aircraft that do not fit into present general classifications.

Helicopter pilots would be required to select paths for takeoffs and landings that would permit emergency landings without undue hazard to passengers or to persons and property on the ground.

One instrument approach to the lowest authorized minimums would be required as recent instrument flight experience. This could be accomplished in a flight under the hood or in a synthetic trainer.

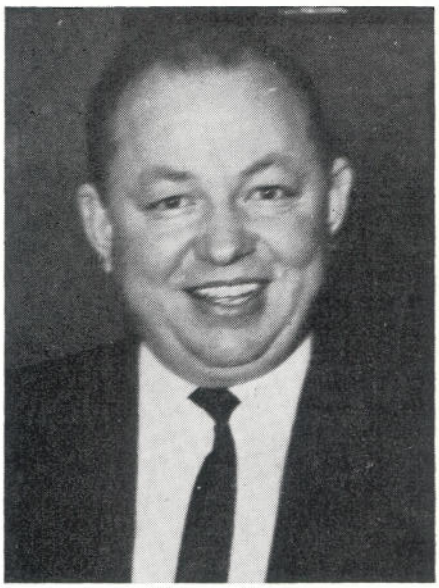
Cross country experience in an airplane under actual or simulated conditions would be required as a prerequisite for an instrument rating in airplanes.

All large aircraft designed for two pilots would be required to have a co-pilot in the crew. Private pilots would be allowed to serve as co-pilots provided the airworthiness certificate of the aircraft or other operations rules do not require a co-pilot.

Other items involve consideration of changes in the rules for displaying aircraft documents, retention of records on aircraft and engine inspection and the establishment of new maintenance or time-in-service records when previous records have been lost.

Reasons for the industry's relatively small use of progressive inspection systems will be discussed. Proposed requirements that aircraft instruments and equipment be in serviceable condition before a takeoff, that flotation gear be required on all aircraft flying over water with passengers—and not only for those carrying paying passengers—will be on the agenda, as will a proposed change of time for checking VOR accuracy from 10 days and 10 hours to 30 days and 30 hours. Miscellaneous items affect flight crew members during periods of physical deficiency, permission for student pilots to fly in furtherance of a business, and a clarification of the "share expense" rules for private pilots.

April 12, 1921—President Harding, in his address to Congress, recommends the establishment of a Bureau of Aviation within the Commerce Department.



HOMER HOLMAN MATA COORDINATOR

Homer L. Holman of Skyway Flying Service, Inc. on Great Falls International Airport acted as the flight schedule coordinator for the Montana Aviation Trades Association in setting up the afternoon flight schedules and flight assignments for the instructors on the Seminar. It was necessary for Homer to devote a tremendous amount of personal time and effort to this project in an attempt to establish a smooth schedule coordinated with the forenoon ground school sessions held at the O'Haire Manor. Homer further acted as Master of Ceremonies at the Awards Dinner held Wednesday evening which was attended by all trainees, many of their wives, the members of the Aeronautics Commission, all the members of the teaching staff from Great Falls and their wives, the teaching staff from the FAA Academy in Oklahoma City and a number of flight operators from the surrounding area.

April 26, 1918—The first Martin Model MB-1 twin-engined bomber is delivered by the Army to the Smithsonian Institution at Washington.

EXAM-O-GRAM NO. 12
THE MAGNETIC COMPASS

The magnetic compass, in terms of its errors, limitations, and in-flight characteristics, is one of those aeronautical subjects in which consistently large numbers of pilots fare poorly on FAA written examinations. There is evidence that this veteran instrument—it was one of the first to be installed in an aircraft—is one of the least understood instruments in the cockpit of today's modern general aviation aircraft. Many pilots seem to operate on the premise that it is easier to ignore this instrument's errors rather than learn them. However, it should be remembered that (1) this is the only directional seeking instrument in the cockpit of most general aviation aircraft, and (2) it is mechanically a simple, self-contained unit (independent of external suction or electrical power for its operation) that is likely to remain reliable at all times—reliable, that is, if the pilot understands its inherent errors.

WHAT ARE SOME OF THE COMPASS ERRORS THAT THE PILOT SHOULD UNDERSTAND?

The pilot should understand:

1. VARIATION — This is the angular difference between **tru north** and **magnetic north** which is plotted on charts in **degrees east or west.** The pilot should understand perfectly **which to add and which to subtract** when converting from true headings or courses and vice versa. (Many pilots find such memory aids as "east is least and west is best" helpful in remembering that **east is subtracted** and **west is added** when going from **true to magnetic.)**

II. DEVIATION—This is the deflection of the compass needle from a position of magnetic north as a result of local magnetic disturbances in the aircraft. To reduce this deviation, the compass has a compensating device consisting of small adjustable magnets. The compass should be checked and compensated periodically. The errors remaining after "swinging" the compass should be recorded on a compass correction card which should be installed in the cockpit within the view of the pilot. (NOTE: Avoid placing metallic objects such as metal computers, flashlights, etc., on top of the instrument panel near the magnetic compass as this practice may induce large amounts of deviation and seriously affect the instrument's accuracy.)

In addition to these errors, the pilot should have a **working knowledge** of the following in-flight errors:

III. OSCILLATION ERROR — The erratic swinging of the compass card which may be the result of turbulence or rough pilot technique.

IV. MAGNETIC DIP—The tendency of the Magnetic Compass to point down as well as north in certain latitudes. This tendency is responsible for:

A. Northerly Turn Error—**This error is the most pronounced of the in-flight errors.** It is most apparent when turning to or from headings of north and south.

B. Acceleration Error—An error that can occur during airspeed changes. It is most apparent on headings of east and west.

As a quick refresher on this instrument's in-flight dip error, we invite you to accompany us on a simulated demonstration flight around the compass rose. Unless otherwise noted, we will limit our bank during turns to a gentle bank. Also, we will assume that we are in the northern hemisphere because the characteristics which we will observe would not be present at the magnetic equator, and would be reversed in the southern hemisphere.

DEMONSTRATION NO. 1 (Heading—North; Error—Northerly Turn Error)

As we start a turn in either direction from this heading, we notice that momentarily the compass **gives an indication of a turn opposite the direction of the actual turn.** (While the compass card is in a banked attitude, the vertical component of the earth's magnetic field causes the northseeking end of the compass to dip to the low side of the turn, giving the pilot an erroneous turn indication.) If we continue the turn toward east or west, the compass card will begin to indicate a turn in the correct direction, **but will lag behind the actual turn**—at a diminishing rate—until we are within a few degrees of east or west. One additional demonstration which we will cover before leaving north is the Slow Turn Error. If, while holding a compass indication of north, we sneak into a very gradual and shallow banked turn—say 3 or 4 degrees of bank—it is possible to change the actual heading of the aircraft by 20 degrees or more **while still maintaining an indication of north by the compass.**

DEMONSTRATION NO. 2 (Heading—East; Error—Acceleration Error.)

The Northerly Turn Error that we previously experienced is not apparent on this heading (or on a west heading). However, let's see what happens when we accelerate and decelerate by changing the airspeed. With the wings level, we will **increase** the airspeed by increasing the power setting or by lowering the nose—or both. Result—although we are holding the nose of the aircraft straight ahead, our compass card erroneously indicates a turn toward **north.** On the other hand, if we **decrease** the airspeed by reducing the power setting or raising the nose of the aircraft—or both, the compass will give an erroneous indication of a turn toward **south.** (Because of the pendulous-type mounting, the end of the compass card which the pilot sees is tilted upward while accelerating, and downward while decelerating during changes of airspeed. This momentary deflection of the compass card from the horizontal, results in an error that is most apparent on headings of east and west.)

DEMONSTRATION NO. 3 (Heading—South; Error—Northerly Turn Error)

Again we are presented with the Northerly Turn Error problem that we encountered in DEM. NO. 1. Although the same set of forces that caused the erroneous indication when we banked the aircraft while on a north heading will likewise be working against us on this heading, the compass indications will appear quite different. For example, as we roll into a turn in either direction, the compass gives us an indication of a turn in the **correct direction** but **at a much faster rate than is actually being turned.** As we continue our turn toward west or east, the compass indications will continue to precede actual turn.

DEMONSTRATION NO. 4. (Heading—West; Error — Acceleration Error)

On this heading we encounter the exact same errors that we have previously covered on a heading of east in DEM. NO. 2. If we **increase the airspeed,** we will get an erroneous indication of a **turn toward south.** (A memory aid that might assist you in recalling this relationship between airspeed change and direction of the error is the word "ANDS"—**A**ccelerate-**N**orth, **D**e-celerate-**S**outh.)

WHAT ARE THE MAIN POINTS THAT SHOULD BE REMEMBERED CONCERNING THESE FOUR DEMONSTRATIONS?

The points we are trying to get across are these: (1) WHEN TAKING READINGS FROM THE MAGNETIC COMPASS WHILE ON A NORTHERLY OR SOUTHERLY HEADING (for establishing a course, setting gyro-driven heading indicator, etc.), REMEMBER THAT IT IS ESSENTIAL TO HAVE THE WINGS PERFECTLY LEVEL FOR SEVERAL SECONDS PRIOR TO TAKING THE READING. (2). IF YOU ARE ON AN EASTERLY OR WESTERLY HEADING, IT IS IMPORTANT THAT THE AIRSPEED IS CONSTANT IN ORDER TO GET AN ACCURATE READING. (3) ON AN INTERMEDIATE HEADING, BOTH OF THE ABOVE CONDITIONS SHOULD BE MET. **(Note:** If your aircraft is equipped with a gyro-driven heading indicator, check it frequently with your magnetic compass.)

TURNS TO HEADINGS BY REFERENCE TO THE MAGNETIC COMPASS

For the pilot who would like a general set of rules for determining his lead point for making turns by reference to the Magnetic Compass, the following is submitted: (Note: The angle of bank should not exceed 15 degrees in order to minimize dip error.)

1. When turning to a heading of north you must allow, in addition to your normal lead, a number of degrees approximately equal to the latitude at which you are flying.

Example: You are making a left turn to a heading of north in a locality where the latitude is **30 degrees N.** You have previously determined your normal lead to be approximately **5** degrees for this particular angle of bank. In this case, you should start your roll-out when the compass reads approximately **35** degrees.

2. When turning to a heading of south, you must turn past your normal lead point by a number of degrees approximately equal to the latitude at which you are flying.

Example: You are making a right turn to a heading of south in a locality where the latitude is **30 degrees N.** You have previously determined your normal lead to be approximately **5 degrees** for this particular angle of bank. In this case, you should turn past your normal lead point of 175 degrees (180 degrees—5 degrees) by **30 degrees,** and start your roll-out when the compass reads approximately **205 degrees.**

3. The error is negligible when turning to east or west, therefore, use the normal amount of lead when turning to an east or west heading.

4. For intermediate headings that lie between the cardinal headings, use an approximation based on the heading's proximity to north or south, the direction of the turn, and your knowledge of the compass's lead and lag characteristics is these areas.

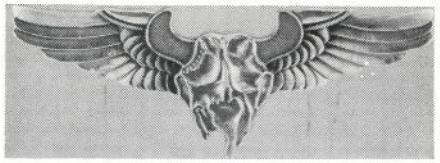
In other words, use an "educated guesstimate." We won't guarantee you that the above method will roll you out on the exact heading every time—at best, it is an approximate method. But it will get you reasonably close to your desired heading, and this beats having no method at all.

KNOW YOUR MAGNETIC COMPASS.

FEDERAL AVIATION AGENCY INSPECTION ITINERARY

AIRPORT	APRIL	MAY
Billings (Logan Field)	2-9-16-23-30	7-14-21-28
Culbertson Municipal	12	9
Gallatin Field (Belgra	17**-18*	15**-16*
Glasgow	11	8
Glendive	25	23
Great Falls Intl.	3**-4*	1**-2*
Havre City-County	5	
Helena City-County	2-9-16-30	7-14-21
Lewistown		29
Miles City	26	24
Missoula County	23**-24*	28**-29*
Silver Bow County (Butte)		

**Flight Tests Only
*Written Only



MONTANA FLIGHT INSTRUCTORS WINGS

The new Montana Flight Instructors Wing pin, which has been copyrighted by the Commission, has been established as an award of merit to professional flight instructors completing a Flight Instructor Refresher Seminar stressing proficiency and teaching techniques and was awarded to the following men at the close of the Seminar at the Awards Dinner held Wed. evening, March 14th in the Administration building in Great Falls, Montana. The design will be used in future years as a symbol of proficiency and a sincere desire on the part of professional instructors in the industry for the improvement and upgrading of flight school activities in the industry. The emblem was awarded by the Montana Aeronautics Commission and pinned by Peggy Mitchell of the Commission staff.

Jack Archibald, Kalispell, Mont.

Lindon G. Harris, Havre, Mont.

A. J. Ledbetter, Malta, Mont.

Monte E. McCann, Great Falls, Mont.

Jeff Morrison, Helena, Mont.

Robert A. Palmersheim, Billings, Mont.

Rodney A. Snider, Missoula, Mont.

David I. Stradley, Belgrade, Mont.

William J. Tope, Fort Benton, Mont.

Robert A. Winterowd, Belgrade, Mont.

E. A. Dunlop, Helena, Mont.

James W. Kruger, Cut Bank, Mont.

Robert H. Lohof, Cut Bank, Mont.

J. M. Mooney, Butte, Mont.

Steve R. Oglesby, Peerless, Mont.

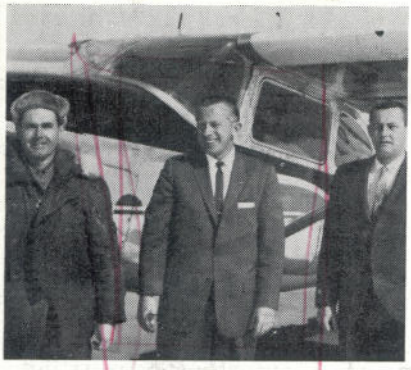
Alfred A. Rise, Dutton, Mont.

Ray Skovgaard, Lewistown, Mont.

Paul Tilleman, Livingston, Mont.

Frank D. Wetzel, Great Falls, Mont.

Joseph Lavallee, Glasgow, Mont.



FLIGHT SCENE AT GREAT FALLS INTERNATIONAL AIRPORT

The above picture is a scene from the afternoon flight activity operating from the ramp of Skyway Flying service at the Great Falls International Airport, during the afternoon sessions of the first Flight Instructors Refresher Seminar.

Trainees were shown flight and instruction techniques by Bernie Geier and Bill Cantwell of the General Aviation District Offices of the FAA in Billings and Helena, coordinated with the forenoon lectures given by Joe Fallin of the FAA Academy in Oklahoma City. Shown above from left to right are Joe Lavallee, Bernie Geier, and Bob Palmersheim. Joe and Bob were checked out by Bernie and acted as instructors in the absence of Bill Cantwell.

Six various makes and models of single engine, four place aircraft were used so that trainees would have the opportunity to become familiar with more makes and models than they might possibly have the opportunity to fly during their work year. Two twin engine models were used in demonstrating air route traffic control procedures, instrument approaches and ground controlled approaches handled by the RAPCON center at Malmstrom AFB.

The trainee instructors were assigned in permanent groups of three as a flight with one designated as pilot in command of the aircraft as a security and safety precaution. The 8 aircraft assigned to the program operated the entire ten days without any lost time whatsoever due to mechanical troubles and not even minor accidents or incidents were reported. However, it was anticipated that the program would operate on schedule and with complete safety due to the class of professional flight instructors that were enrolled as trainees in this course.

April 6, 1917—As of this date, the Aviation Section of the Signal Corps consists of 35 pilots, 1,987 enlisted men, and 55 training airplanes. The Navy has 38 officer-pilots, 163 men, and 54 airplanes.

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NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS

PURPOSE:—**"To foster aviation as an industry,** as a mode of transportation for persons and property and as an arm of the national defense; to join with the Federal Government and other groups in **research, development,** and **advancement of aviation;** to develop uniform aviation laws and regulations; and to otherwise encourage co-operation and mutual aid among the several states."

MONTANA AERONAUTICS COMMISSION
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P. O. Box 1698
Helena, Montana

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